

NOTES ON TWO LITTLE-KNOWN WOOD-BORING
BEETLES. *CHRYSOBOTHRISS* *SYLVANIA* FALL
AND *MELASIS* *RUFIPENNIS* HORN.
(BUPRESTIDÆ, ELATERIDÆ.)

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Chrysobothris sylvania Fall.

This buprestid was described by Prof. H. C. Fall (1)¹ as follows: Original Description:

"*C. sylvania* new species. Closely allied to *trinervia*, but rather broader and heavier, the color beneath bright green in the male, dark green with cupreous reflections in the female; prothorax as abruptly or even more abruptly narrowed behind than in front; elytral costæ not as distinctly elevated as in typical *trinervia*, the smooth spaces sharply defined, the punctured areas more densely punctate than in *trinervia*; sexual characters as in *trinervia*. Length 11.5-11.8 mm.; width 5-5.1 mm."

The type material consisted of four specimens, two of each sex, taken by Mr. Ricksecker at Sylvania, Calif.

The next reference to this species is in Dr. Woodworth's "Guide to California Insects" (2) where he merely lists *C. sylvania* as occurring in California.

In 1916 Dr. E. C. Van Dyke (3) mentions that the type material was taken in Sonoma Co., and that Mr. Nunenmacher had taken a specimen in Del Norte Co., also that specimens had been taken in Oregon by Mr. J. C. Bridwell and myself. In 1917 (4) I summarized the foregoing information and added some Oregon localities to the distribution and gave Douglas fir as a host tree.

Aside from the brief notes mentioned there has been nothing concerning this species published.

Adult. Length 12 mm.; width 5 mm.

Antennæ green, lobes of joints 4 to 11 purplish, joints 1 to 3 more slender than 4, joints 4 to 11 gradually narrowing, third joint as long as the next two. Upper front brassy green, lower portion brilliant green, densely, coarsely punctate with two smooth callosities. Clypeus broadly emarginate, acute at

¹ Numbers refer to the bibliography.

sides. Thorax twice as wide as long, sides subparallel at middle, narrowing rapidly one-fourth from apex and base, median sulcus deep at middle, densely and deeply punctured, obliterated by elevated smoother spaces at either end, broad, irregular, broken, elevated, smooth places each side of median depression. Elevated spaces irregular, black and smooth, punctured areas brassy green, more brilliant green along lateral margins. Base of elytra distinctly wider than thorax, sides parallel for slightly more than one-half their length, then narrowing sharply and serrate. Apices rounded; first costa nearly entire, prominent and smooth; others obliterated; basal foveæ deep; remainder of elytral surface composed of about equal areas of elevated, smooth, dark areas and depressed, densely punctured, dark green areas; under parts of male uniformly bright metallic green.

FEMALE: Bluish-purple beneath, prosternum more smooth and shining; anterior tibia arcuate, not suddenly dilated at tip.

MALE: Prosternum densely hairy; anterior tibia arcuate and suddenly dilated at tip.

Pupa. The pupa (Plate VII, fig. 1) is of the common *Chrysobothris* type; white or yellowish-white in color, head bent sharply forward, resting on the breast with the legs and wing pads folded on the ventral surface. Length, 10 to 12 mm.; width, 5 to 5.5 mm.

Larva. The larva (Plate VII, fig. 2) is whitish, and of the typical flathead type, sparsely covered with fine bristle-like hairs. The ventral plate is oval, roughened and marked by a long inverted V, formed by two deep grooves, the apex of the V touches the anterior margin of the plate while the open end stops about one-sixth from the posterior margin. The ventral plate is of the same oval shape but slightly smaller than the dorsal, the median groove does not reach either margin. The fourth segment is shorter and narrower than the fifth. The last segment is decidedly constricted. Length, 24-27 mm. Width of first thoracic segment, 4.5-5.5 mm.

Egg. The egg is oval, semitransparent, flattened on the side which comes in contact with the bark; average measurements are about 1 by .6 mm. The eggs are deposited singly, in crevices or under the edge of bark scales. Observations indicate that eggs may be deposited in clusters or near to one another, as seven young larvæ were found under one piece of bark, roughly 6 by 8 inches, and three full grown larvæ making pupal cells in an area three inches square.

SEASONAL HISTORY.

The eggs are deposited in crevices of the bark in late April and May, in the vicinity of Corvallis;² the minute larvæ enter the bark, work to the cambium and extend their mines through the cambium, bark or wood during the summer, fall and winter. Pupation takes place in March or April and lasts from two to three weeks. The first adults were noted April 16.

WORK AND HABITS.

The habits of the larvæ differ, some work only a short time in the cambium, excavating their characteristic oval tunnels which are about three-fourths in the bark and one-fourth in the wood; they then enter the sapwood and often work into the heart wood; others seem to spend almost their entire larval stage in the cambium. Just prior to pupation the larva digs to the outer portion of the bark, leaving a thin covering over the future exit hole. From here the larva invariably returns to the sapwood to pupate. From one-fourth to one-half an inch below the cambium will be found the pupal cell, which measures from 7 to 10 mm. in width and 12 to 15 mm. long, always parallel to the surface and with the grain of the wood. The mines are packed with borings and excrement but lack the concentric appearance of the packings in the mines of many of the group.

PARASITES.

The most important parasite of this beetle seem to be a predacious mite *Pediculoides ventricosus*.³ These mites were found in great numbers on both larvæ and pupæ. The males are hardly visible to the unaided eye, while the females appear as small spherical yellow bodies, which might be taken for eggs; the largest are almost one mm. in diameter. The extent of the ravages of these mites may be judged from the following experiments.

² Elevation 400 ft. Latitude 44° 32'. N. Longitude 123° 16' W.

³ This peculiar species belongs to the small family *TARSONEMIDÆ*. The male and female differ radically. The female when mature has the abdomen enormously swollen so that it is 20 to 100 times greater than the rest of the body due to the mass of eggs within. The eggs hatch and the young grow within the body of the parent and are born sexually mature. The male has almost no abdomen, the body is short and angulate behind. Both sexes possess needle-like mandibles and sucking mouth parts.

A piece of wood containing larvæ of *C. sylvania* was collected in March and put in a breeding cage. On April 7, the wood was opened to get larvæ for study and the first specimen encountered was dead, shriveled and covered with mites. Upon further examination 12 larvæ and 4 pupæ were found, all dead and literally covered with mites. Another specimen of wood collected in the same locality at about the same time contained fourteen larvæ, ten of which were either dead or in a dying condition due to the mites. Two were unfested and emerged April 22 and April 24 as male beetles; of the remaining two, one died from no apparent cause and the other was parasitized by an ichneumon fly. Three undetermined species of Ichneumonidæ were found to be parasitic upon the beetles. The largest species was found to be quite common in certain infested logs. Breeding experiments indicate that about 20 per cent. of the beetles are destroyed by these ichneumon flies.

Melasis rufipennis Horn.

Of this species I am able to find no reference in our literature other than the original description by Dr. Horn⁴ followed by the statement that it occurs in Nevada and Washington Territory.

There are two species of this genus found in our fauna *M. pectinicornis* Mels. being the eastern representative and *M. rufipennis* Horn, the western. Both species seem to be quite rare.

Original description:

"*M. rufipennis* n. sp.—Form elongate, subcylindrical, slightly narrowed behind, piceous, subopaque; pubescence fulvous, scarcely visible, elytra and antennæ rufo-ferruginous; antennæ attaining the middle of the thorax, the third joint nearly twice as long as the visible (in front) portion of the second, joint four triangular, broader than long, five to ten gradually more prolonged anteriorly, but less so than in *pectinicornis*: eyes small, round, feebly convex; head densely and rather coarsely punctate, not rough, clypeus slightly concave, front sometimes with a slight transverse carina; thorax a little wider than long, slightly narrower behind, sides straight, slightly arcuate at the apical angles and with a feeble sinuation in front of the hind angles, which are acute and slightly divergent; disc moderately convex, densely punctured and roughly granulate, with a narrow median smooth line very distinctly impressed posteriorly; elytra gradually narrowed posteriorly, the apices, acute, disc deeply striate with coarse punctures, the intervals convex, densely punctured, but more shining than above: legs piceous, tibiæ and tarsi brown. Length .36-.42 inch; 9-19.5 mm."

⁴ Trans. Amer. Ent. Soc., Vol. XIII, p. 7 (1886).

In addition to Horn's description it is well to note that the thorax is decidedly darker than the elytra, usually black. In the male, which is smaller than the female, the antennæ is more pectinate, wider, a little longer. The thorax is decidedly more narrowed posteriorly. The last ventral segment is elevated at the center into two blunt spines, in much the same manner as certain Scolytidæ. These spines are present in both sexes but more highly developed in the male. Dr. Horn gives the length 9-19.5 mm., the latter figure is probably an error. In examining over 100 specimens the smallest was 8.3 mm. and the largest 12.2 mm. long. (Plate VIII, fig. 3.)

Larva. Yellowish white, first segment behind head is flattened and broader than the others, second slightly broader than third, from the third on the segments are the same size with the exception of the anal segment which is decidedly constricted. In segments 5 to 11 the anterior third is constricted; the posterior two-thirds more rounded and larger; length 26 to 29 mm.; width of first thoracic segment 3.5 mm. Mouth parts dark brown or black and well developed. The dorsal and ventral plate of the first thoracic segment is marked by a double "TT," dark reddish brown in color, the cross arms of the T's do not touch; the lateral half of each cross arm is thickened, Plate VIII, fig. 5.

Pupa. The pupa, Plate VIII, fig. 4, is yellowish, slender, 12 mm. long, 3 mm. wide; has the cylindrical appearance of the adult; the head is bent forward on the breast and the appendages are folded on the ventral surface in the same manner as buprestid pupæ.

SEASONAL HISTORY.

Larvæ, pupæ, and fully formed adults were found in April. The first adults observed emerged April 16 and the last pupa were found June 2. What appeared to be full-grown larvæ have been taken in February, April, June, September and November. This would indicate that more than one year is spent in the larval stage.

LIFE HISTORY.

No eggs were observed and although larva, pupa and adults were taken from the same tree for three years and hundreds of beetles emerged, no indications of reinfestation of nearby trees were ob-

served. The hundreds of larvæ seen were practically all the same size, no small specimens being observed. The larvæ do not work in the cambium but go directly into the wood.

The mines, Plate VIII, figs. 1 and 2, are flat, approximately 4 by 1.5 mm. in cross section, very long, winding, often crossing each other. Before pupation the larva excavates almost to the surface then retreats back into the wood, enlarges the mine and pupates. When ready to pupate the larva is always found doubled back on itself with the head and anal end pressed tightly together. The newly formed adult makes its way to the surface along the mine made by the larva. This flat mine is too small to allow the passage of the body of the adult, so it is forced to enlarge it, emerging through a perfectly round tunnel from 3.5 to 4 mm. in diameter.

WORK.

The flat mines of the larva literally honey-comb the wood of trees attacked.

A Grand fir tree, sixteen inches in diameter, was found attacked from the base to a height of eight feet and there was hardly a square inch of the wood which was not penetrated by at least one mine. This tree was living when first noted (1914) and the colony of beetles had been in it for some time as there were numbers of emergence holes present. In 1916 the tree broke off at a point four and one-half feet from the ground; there were still many beetles present in various stages. The tree was still living but so weakened by the larval mines that it was an easy prey to the wind. The only other colony of these beetles observed was in a white fir and the tree had been broken off by the wind in the same manner. A few dead beetles and the characteristic mines gave evidence of the cause.

Distribution: Washington, Oregon and Nevada. In Oregon a few dead specimens were collected on Paddy Creek near Sparta, in the Blue Mountains of Grant County, and a large colony lived for years in a Grand fir tree within a mile of the Oregon Experiment Station at Corvallis.

Hosts: Taken from Grand fir (*Abies grandis*) and white fir (*Abies concolor*).

